

## **REMARKS**

Applicants respectfully request reconsideration and allowance of all pending claims.

### **I. Status of Pending Claims**

Claims 90-122 remain pending. Claims 90-95, 98-102, 106, 107, 113, 114, 116-119 and 122 are currently under consideration, while claims 96, 97, 103-105, 108-112, 115, 120 and 121 have been withdrawn from consideration at this time.

In this Amendment E, it is to be noted that claim 90 has been amended to more particularly claim certain embodiments of the present invention. More specifically, claim 90 has been amended to further emphasize that the displaced solubilizing ligand present in the polymerization mixture is the same solubilizing ligand that is displaced in the preceding process step of forming the metal-ligand compositions. Support for these amendments may be found in the text of claim 90, as previously presented.

### **II. Claim Rejections under §103**

Applicants respectfully request reconsideration of the rejection of claims 90-95, 98-102, 106, 107, 113, 114 and 116-119, all of which were previously found allowable, under 35 U.S.C. §103 as being unpatentable over Weinberg et al. (U.S. Pat. 6,030,917) and Johnson et al. (J. Am. Chem. Soc., **1995**, 117(23), pp. 6414-6415). Additionally, Applicants respectfully request reconsideration of the rejection of claim 122, also previously found allowable, under 35 U.S.C. §103 as being unpatentable over Weinberg et al. (U.S. Pat. 6,030,917) and Johnson et al. (J. Am. Chem. Soc., **1995**, 117(23), pp. 6414-6415), in view of Murata et al. (U.S. Pat. 5,892,075).

In the interests of brevity, Applicants will not restate all of the comments previously submitted in their Amendment D (filed December 16, 2005) and their Letter

to the Patent Office (filed August 21, 2006). Applicants do, however, maintain all of those comments with respect to the present rejections.

A. The Claimed Subject Matter

Claim 90, from which all other pending claims depend, is directed to a process for preparing and screening an array of metal-ligand compositions. The process comprises:

preparing an array of metal-ligand compositions in a plurality of discrete reaction vessels contained by or within an integrated structure, wherein the plurality of reaction vessels of the array contain different metal-ligand compositions and said preparing comprises delivering a metal-binding ligand and a dissolved, soluble metal precursor to each of the plurality of reaction vessels of the array which combine to form the metal-ligand composition, wherein said soluble metal precursor comprises a solublizing ligand and formation of one or more of the metal-ligand compositions is accompanied by the displacement of said solublizing ligand;

delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein, wherein one or more of said polymerization mixtures contains the displaced solublizing ligand resulting from the preparation of said metal-ligand compositions;

subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and

screening said array for a polymerization reaction product,

wherein the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%.

Accordingly, the process of claim 90 is directed to, in part, the preparation of an array of metal-ligand compositions using a soluble metal precursor that is dissolved, wherein as a result of that preparation a solublizing ligand is displaced therefrom. Furthermore, this displaced solublizing ligand is present in the subsequently formed polymerization mixture, and reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization screening reaction by less than 80%.

As noted in the present application, the solution-based process of the present invention is advantageous for a number of reasons, such as for example that it enables a screening polymerization reaction to be carried out without the need for a purification step prior thereto (e.g., filtration, washing and/or recrystallization step). Accordingly, by-products resulting from the preparation of the metal-ligand compositions, such as the displaced solublizing ligand, are present in the polymerization mixtures that are subsequently prepared. (See, e.g., p. 3, lines 6-26; p. 5, line 32 to p. 6, line 9; p. 41, lines 23-27; p. 45, lines 30-35; and, Examples 1-35). The present process is therefore advantageous because the displaced solublizing ligand that is present in the polymerization mixture is sufficiently innocuous, such that it reduces the catalytic activity of the metal-ligand composition in the polymerization reaction by less than 80%.

As explained in detail below, the Office has failed to appreciate that the present invention calls for that the displaced solublizing ligand that is present in the polymerization mixture to be the same solublizing ligand that is displaced in the previous process step of preparing the metal-ligand compositions.

B. Weinberg et al.

Applicants acknowledge that Weinberg et al. disclose a process wherein a ligand is displaced from the metal precursor employed in preparing the product catalyst, or metal-ligand composition. Notably, however, Weinberg et al. make no reference to the subsequent formation of a polymerization mixture in the presence of the very same displaced ligand. In fact, it is to be noted that the resulting product (i.e., catalyst or metal-ligand composition) is purified prior to carrying out a subsequent reaction, such as a polymerization reaction. (See, e.g., Weinberg et al. at column 42, scheme 9 and related text.)

Accordingly, Applicants respectfully submit that Weinberg et al. make no reference to a polymerization reaction performed in the presence of a solublizing ligand that was displaced by the previous process step of forming the metal-ligand composition.

C. Johnson et al.

Applicants also acknowledge that Johnson et al. disclose a process wherein a ligand is displaced from the metal precursor employed in preparing a catalyst, or metal-ligand composition. Notably, however, Johnson et al., like Weinberg et al., make no reference to a polymerization reaction performed in the presence of the solublizing ligand that was displaced by forming the catalyst. Rather, Johnson et al., like Weinberg et al., disclose a process wherein the resulting product (i.e., catalyst or metal-ligand composition) is purified prior to carrying out a subsequent reaction, such as a polymerization reaction. Thus, Applicants submit that Johnson et al. arguably teach away from the claimed process.

In this regard, Applicants respectfully submit the Office has effectively admitted that the ligand displaced in a step prior to the polymerization step is not the same as the

displaced ligand present in the polymerization mixture. Specifically, the Office notes the following:

- (1) The act of forming the Pd(II) and Ni(II) initiators (or catalyst), denoted by structures 1 and 2 in Scheme 1A (p. 6414, top of second column), involves the protonation, or activation, of the palladium and nickel dimethyl precursors, denoted by structures 3 and 4 (p. 6414, top of second column), with the activator,  $\text{H}(\text{OEt}_2)_2^+\text{BAR}'_4^-$ , which is accompanied by the loss of methane. (See, e.g., the last paragraph at the bottom of page 5, carrying over to the top of page 6, of the present Office action.)
- (2) The resulting protonated or activated species is then reacted with a monomer (ethylene, propylene or 1-hexene), which results in the displacement of an ether adduct (i.e.,  $\text{OEt}_2$ ) and production of a polymer product.

Accordingly, the Office admits that the displaced ligand in the polymerization mixture is not the same ligand that is displaced by the act of forming the activated initiator. As a result, the Office also admits that the polymerization mixture formed by Johnson et al. contains a ligand (i.e.,  $\text{OEt}_2$ ) that is not the same ligand (i.e., methane) as the one displaced by the preceding act of forming the activated initiator.

D. Conclusion In View of Weinberg et al. and Johnson et al.

In view of the forgoing, Applicants respectfully submit the Office has failed to establish a *prima facie* case of obviousness because, *at a minimum*, (i) the cited references fail to disclose or suggest all of the claim limitations, and/or (ii) the Office has failed to provide a convincing line of reasoning to support that there is some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the teachings of Weinberg et al. and Johnson et al., alone or further in view of Murata et al., in order to obtain the process of any of the presently rejected claims.

Specifically, Applicants submit the references fail to disclose or suggest a process wherein the solubilizing ligand that is displaced in a process step involving the formation of metal-ligand compositions is the same displaced ligand present in a subsequent process step involving forming a reaction mixture (e.g., polymerization reaction mixture). In fact, the cited combination of references arguably teaches away from such a process, because both clearly teach the act of performing a purification step after forming a metal-ligand composition and before forming any subsequent reaction mixture (e.g., polymerization reaction mixture). As such, both references also fail to disclose or suggest such a process wherein the displaced ligand, present in a polymerization reaction mixture as a result of the prior formation of a metal-ligand composition, reduces the catalytic activity in the polymerization screening reaction by less than 80%. It is therefore respectfully submitted that the Office has failed to establish a prima facie case of obviousness, because the combination of Weinberg et al. with Johnson et al. fail to disclose or suggest all of the limitations of claim 90.

Applicants additionally submit that the Office has failed to establish a *prima facie* case of obviousness because the Office has failed to provide a convincing line of reasoning to support that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the teachings of Weinberg et al. and/or Johnson et al., in order to obtain the process of claim 90. Applicants respectfully submit there is simply no motivation for one of ordinary skill in the art to modify the processes disclosed in Weinberg et al. or Johnson et al., in order to obtain a process for preparing and screening an array of metal-ligand compositions in a polymerization reaction, wherein a polymerization reaction mixture formed therein contains the solubilizing ligand that is displaced by a previous process step of forming the metal-ligand compositions, and further wherein this displaced solubilizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than 80%. There is no such motivation because Weinberg et al. and Johnson et al. both disclose processes wherein the resulting metal-ligand composition, or catalyst, is purified prior to

a subsequent reaction, and as such disclose processes wherein any displaced solublizing ligand is removed, and therefore not present in any subsequently formed reaction mixture. Applicants therefore submit it is only through impermissible hindsight, in view of the present application, that one of ordinary skill in the art would be motivated to modify the processes of Weinberg et al. and Johnson et al. to obtain a process wherein a polymerization reaction mixture is formed in the presence of the solublizing ligand displaced by a previous process step involving the formation of a metal-ligand composition, and further wherein this displaced solublizing ligand reduces the catalytic activity in the polymerization screening reaction by less than 80%.

E. Conclusion In View of Weinberg et al., Johnson et al. and Murata et al.

With respect to claim 122, Applicants submit the addition of Murata et al. does nothing to address the failures of the Weinberg et al. and Johnson et al. disclosures. Specifically, Murata et al. fail to disclose or suggest a process for preparing an array of metal-ligand compositions using a soluble metal precursor that is dissolved, wherein as a result of that preparation a solublizing ligand is displaced therefrom, and further wherein (i) the solublizing ligand displaced in a process step of forming a metal-ligand composition is present in a subsequently formed polymerization mixture, and (ii) this displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture, in a polymerization screening reaction, by less than 80%. Rather, Murata et al., similar to Johnson et al., is focused on the preparation of metal-ligand compositions which, after purification, may be used in a subsequent polymerization reaction. (See, e.g., the Examples in Murata et al., wherein every compound prepared therein is isolated and/or purified in some manner, prior to being used in a subsequent reaction.)

F. Additional Comments

Applicants note the Office's assertion that the "comprising" language of claim 90 does not exclude an additional step of purification of the "metal-ligand composition."

However, Applicants respectfully point out that, as noted above, claim 90 does call for the solublizing ligand displaced by the act of forming the metal-ligand composition to be present in the subsequently formed reaction mixture. Clearly, none of the references cited by the Office disclose or suggest such a process. Therefore, Applicants do not believe it is necessary to comment further on the Office's assertion at this time. However, Applicants respectfully reserve the right to do so at a later date, if necessary.

Applicants also note the Office's assertions with respect to the language in claim 90 that states the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization screening reaction by less than 80%. However, in view of Applicants' comments above with respect to the failures of the cited references, Applicants do not believe it is necessary to comment further on the Office's assertion at this time. However, Applicants respectfully reserve the right to do so at a later date, if necessary.



**CONCLUSION**

In view of the foregoing, Applicants respectfully submit claim 90, as well as claims 91-95, 98-102, 106, 107, 113, 114, 116-119 and 122 depending therefrom, are patentable over the cited combination of references. Reconsideration of the rejection of these claims, as well as all pending claims, is therefore respectfully requested.

The Commissioner is hereby authorized to charge any fee deficiency in connection with this Amendment E (including payment of a one-month extension of time) to Deposit Account Number 19-1345 in the name of Senniger, Powers, Leavitt & Roedel.

Respectfully submitted,

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